MOS-2000: A New Era in Interpretive Weather Guidance?

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For nearly 3 decades, the National Weather Service has produced objective weather element guidance by applying the Model Output Statistics (MOS) technique to forecasts from the National Centers for Environmental Prediction's dynamical weather prediction models. During this period of time, many different models have been used. As each dynamical model matured and as an adequate sample of model output was collected, the MOS approach has been applied. "Two years of data" became our rule of thumb for development of robust statistical relationships; additional data were always desirable, particularly for development of statistical equations to predict weather elements such as precipitation type, snowfall amount, severe weather, or low categories of visibility. Thus, during different periods, MOS guidance has been available from the Primitive Equation (PE) model, Limited-area Fine-mesh Model (LFM), Nested Grid Model (NGM), and Global Spectral Model (GSM). Currently, complete packages of MOS guidance are available from the NGM for forecast periods out to 60 hours and from the Medium Range Forecast (MRF) run of the GSM for forecast periods out to 192 hours. A rudimentary package of MOS guidance based on the Aviation run of the GSM is also available for forecast periods out to 72 hours.

Good databases of model forecasts and weather observations, software to process data and perform statistical analyses, and meteorological insight are essential to the development and implementation of a MOS system. The MOS database and software system used until now were designed in the 1970's and reflected the technology of that era. The Techniques Development Laboratory (TDL) has nearly completed the first phase of re-engineering the MOS system by developing new archives with a standardized data format and writing new software to do data preparation and statistical analysis. This system, dubbed MOS-2000, is designed for modern workstations and will increase the productivity of the MOS developers. Consequently, the ability to respond more quickly to changes in the NCEP models and to develop frequent updates to the MOS system offers the potential of a new era in which new or revised MOS equations are implemented on a regular basis.

TDL is using the MOS-2000 system to develop a new suite of guidance based on the AVN and MRF. The AVN-based MOS guidance will provide a complete set of forecasts for projections out to 72 hours for over 1000 stations in the contiguous United States, Alaska, Hawaii, and Puerto Rico. The MRF-based MOS guidance will be available for a revised set of weather elements, for projections out to 192 hours, and for the same set of stations available in the short-range guidance. Initial versions of both guidance packages are scheduled for implementation in the fall of 1999. In this presentation, we discuss both sets of guidance with emphasis on the definitions of the weather elements and comparisons between the new guidance and the NGM-based or older MRF-based MOS guidance.